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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/047,554	10/23/2001	William A. Wojtczak	ATMI-396-CIP II	4181
25559	7590	04/23/2004	EXAMINER	
ATMI, INC. 7 COMMERCE DRIVE DANBURY, CT 06810			UMEZ ERONINI, LYNETTE T	
			ART UNIT	PAPER NUMBER
			1765	

DATE MAILED: 04/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/047,554

Applicant(s)

WOJTCZAK ET AL.

Examiner

Lynette T. Umez-Eronini

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-56 is/are pending in the application.
- 4a) Of the above claim(s) 30-55 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12, 17-27 and 56 is/are rejected.
- 7) ☒ Claim(s) 13-16, 28 and 29 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This communication is in response to applicant's REMARKS (on pages 32-39 of Amendment, filed 1/14/2004), in which applicants presented persuasive arguments as to why the Leon (US 6,030,932) reference fails to qualify as prior art over the claimed invention. A new Office action is presented.

#### ***Claim Objections***

1. Claim 14 is objected to because of the following informalities: The acronym for "TEAHF" is not specified. Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 4-8, 10, and 12; 17, 18, 19, 22, and 23 are rejected under 35 U.S.C. 102(b) as being anticipated Keeney (US 4,371,443).

Keeney teach an aqueous composition containing 2.35 g of ammonium fluoride, 2.86 g of formaldehyde and 1.83 g of hexamethylenetetramine (HMTA) (column 6, lines 38-40). Since Keeney's composition comprises the same chemical components as those claimed by the applicants, then using Keeney's composition in the same manner

as the claimed invention would inherently result in, a post CMP cleaning formulation.

The aforementioned further reads on,

the composition an organic amine, a fluoride source and encompasses from 70% to 98% water by weight, based on the total weight of the formulation, **in claims 1, 12, 17, 18, 19, 22, and 23;**

wherein said fluoride source comprises from about 0.1% to about 5.0% fluoride source by weight, based on the total weight of the formulation, **in claim 4;**

wherein said fluoride is selected from the group consisting of: ammonium fluoride, **in claim 5;**

wherein said formulation comprises from about 1% to 15% organic amine of the formulation, **in claim 6;**

wherein said organic amine is selected from the group consisting of: hexamethylenetetramine, **in claim 7;** and

encompasses said formulation comprises from about 0 to about 5.0% metal chelating agent, by weight based on the total weight of the formulation, **in claim 8** and comprises from about 0 to about 5.0% metal chelating agent, by weight based on the total weight of the formulation, **in claim 10.**

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 2 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keeney (US '443) as applied to claim 1 above, and further in view of Borah (US 5,421,906).

Keeney differs in failing to teach said formulation further comprises a metal chelating agent, **in claim 2**.

Borah teaches an aqueous composition that comprises oxalic acid (same as applicants' chelate) along with hydrofluoric ammonium bifluoride, and triethanolamine (column 10, lines 1-3-5, 25-28, and 43-51).

It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Keeney's composition by employing oxalic acid, as taught by Keeney for the purpose of removing stains of iron oxide (Borah, column 10, lines 35-37).

7. Claims 3, 11; and 20, 21, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keeney (US '443) as applied to claim 1 above, and further in view of Schonauer (US 5,662,769).

Keeney differs in failing to teach the cleaning formulation comprises a nitrogenous component, in claim 3 and the nitrogenous component is selected from the group consisting of the compounds as recited in claim 11; and a nitrogenous component selected from nitrogen-containing carboxylic acids and imines, **in claims 20, 21, and 24.**

Schonauer teaches, "... contaminants introduced ... by the CMP processing, ..., can be removed from the wafer by a cleaning solution containing ... EDTA ... (column 6, lines 13-22), which is same as applicant's nitrogenous component).

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Keeney by employing Schonauer's EDTA for the purpose of releasing all buried contaminants from beneath the surface (Schonauer, column 6, lines 19-22).

8. Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keeney (US '443) in view of Schonauer (US '769) as applied to claim 17 above, and further in view of Wojtczak et al. (WO 98/00244).

Keeney in view of Schonauer differs in failing to teach the said formulation includes a metal chelating agent of the formula: X-CHR-Y, **in claim 26** and to specify X and Y is independently selected from the functional groups as recited **in claim 27.**

Wojtczak teaches, "A semiconductor cleaning formulation . . ." (Abstract). "Other 1,3-dicarbonyl compounds and related compounds . . . have the following general structure:  $\text{-CHR-Y}$  (same as applicant's metal chelating agent formula) . . ." (page 7, lines 6-10).

It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Keeney in view of Schonauer by using compounds having the said structure,  $\text{-CHR-Y}$ , as taught by Wojtczak's for the purpose of removing inorganic residues (page 2, lines 6-12).

9. Claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Keeney (US '443) in view of Schonauer (US '769).

Keeney differs in failing to teach the cleaning formulation comprises a nitrogenous component selected from nitrogen-containing carboxylic acids and imines.

Schonauer teaches, ". . . contaminants introduced . . . by the CMP processing, . . ., can be removed from the wafer by a cleaning solution containing . . . EDTA (same as applicant's nitrogenous component), . . ." (column 6, lines 13-22).

It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Keeney by employing EDTA, as taught by Schonauer for the purpose of releasing all buried contaminants from beneath the surface (Schonauer, column 6, lines 19-22).

***Allowable Subject Matter***

10. Claims 13-16, 28 and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to teach PMDETA (pentamethyldiethylenetriamine) in combination with the components as recited in claims 13-16; and a metal chelating agent having the formula,  $R_1R_2R_3R_4N^+O_2CCF_3$ , in which R groups are hydrogen or aliphatic; and a nitrogenous component having the formula,  $COOH-CH_2-NRR'$ , in which R and R' is selected from the group consisting of hydrogen, alkyl, aryl, and carboxylic acids, respectively in a cleaning formulation, of claims 28 and 29.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 571-272-1470. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ltue

April 19, 2004

**NADINE G. NORTON**  
**SUPERVISORY PATENT EXAMINER**

